

What is claimed is:

1. A method for manufacturing MTJ cell of MRAM comprising:

5 forming a metal layer for connection layer connected to a semiconductor substrate through a lower insulating layer;

forming a first pinned magnetic layer on the metal layer;

10 forming a second pinned magnetic layer on the metal layer, wherein a first annealing process and a second annealing process are performed in sequence with a first and a second magnetic fields applied respectively, the magnitude of the first magnetic field being larger than that of the
15 second magnetic field;

sequentially forming a tunneling barrier layer, a free magnetic layer and a MTJ capping layer on the second pinned magnetic layer; and

20 patterning the MTJ capping layer, the free magnetic layer, the tunneling barrier layer, the first amorphous layer and the pinned magnetic layer using a MTJ cell mask to form a MTJ cell.

2. The method according to claim 1, wherein the
25 second pinned magnetic layer comprises a stacked structure of a magnetic layer-insulating layer-magnetic layer

3. The method according to claim 1, wherein the first annealing process and a second annealing process are performed at a temperature ranging from 250 to 300°C, respectively, and the magnitude of the magnetic field applied during the first annealing process ranges from 1 to 10 KOe and the magnitude of the magnetic field applied during the second annealing process ranges from 100 to 999 Oe.

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